Complete Summary

GUIDELINE TITLE

Practice guidelines for the management of infectious diarrhea.

BIBLIOGRAPHIC SOURCE(S)

Guerrant RL, Van Gilder T, Steiner TS, Thielman NM, Slutsker L, Tauxe RV, Hennessy T, Griffin PM, DuPont H, Sack RB, Tarr P, Neill M, Nachamkin I, Reller LB, Osterholm MT, Bennish ML, Pickering LK. Practice guidelines for the management of infectious diarrhea. Clin Infect Dis 2001 Feb 1;32(3):331-51. [222 references]

GUIDELINE STATUS

This is the current release of the guideline.

COMPLETE SUMMARY CONTENT

SCOPE

DISEASE/CONDITION(S)

Infectious diarrhea

GUIDELINE CATEGORY

Diagnosis
Evaluation
Prevention
Treatment

CLINICAL SPECIALTY

Family Practice
Gastroenterology
Infectious Diseases
Internal Medicine
Pediatrics
Preventive Medicine

INTENDED USERS

Advanced Practice Nurses
Allied Health Personnel
Nurses
Physician Assistants
Physicians
Public Health Departments

GUIDELINE OBJECTIVE(S)

To provide clinicians and public health practitioners with a consensus-based guideline that will aid in the management of acute diarrhea by addressing which patients to test, what tests to order, what medical treatments to use, and what steps to take to ensure that appropriate public health actions are implemented

TARGET POPULATION

Diagnosis and Management

Patients in the industrialized world, in particular the United States, with confirmed or suspected infectious diarrhea.

Prevention

General population in the industrialized world, in particular the United States.

INTERVENTIONS AND PRACTICES CONSIDERED

Diagnosis

1. Physical examination that may show abnormal vital signs (including fever, orthostatic pulse, and blood pressure changes), other signs of volume depletion, abdominal tenderness, and altered sensorium.
2. Clinical evaluation that includes questions about length and duration of illness, stool characteristics, frequency of bowel movements, quantity of stool produced, presence of dysenteric symptoms, symptoms of volume depletion, associated symptoms and their frequency and intensity.
3. Epidemiologic evaluation of risk factors for infectious diarrhea.
4. Fecal studies, including stool culture, fecal leukocytes or lactoferrin, bacterial toxin testing (e.g., Clostridium difficile), screening for ova and parasites.
5. Other diagnostic evaluations, such as, serum chemistry analysis, complete blood cell count (CBC), blood cultures, urinalysis, abdominal radiography, anoscopy, and flexible endoscopy.

Treatment

1. Oral rehydration solutions, such as Ceralyte, Pedialyte, or generic solutions
2. Intravenous rehydration
3. Vitamin and zinc repletion
4. Pathogen-specific antimicrobial therapy or empirical therapy, such as fluoroquinolones (ofloxacin, norfloxacin, ciprofloxacin), ceftriaxone, azithromycin, erythromycin, doxycycline, aminoglycoside, metronidazole, paromomycin, diiodohydroxyquin, or trimethoprim-sulfamethoxazole, albendazole.
5. Antimotility agents

Prevention

1. Diagnostic fecal testing for public health reasons (e.g., during suspected outbreaks)
2. Disease reporting to appropriate public health authorities
3. Clinical isolate subtyping
4. Follow-up testing to confirm cure or lack of carrier state
5. Patient education in personal hygiene (e.g., hand-washing) and risk for infection, especially in high-risk groups
6. Administration of cholera and typhoid vaccines for travelers to endemic areas. (Note: Parenteral cholera vaccine is considered but not recommended; the oral live vaccine [CVD 103HgR] is licensed only outside the United States. Typhoid vaccines available in the United States are the parenteral Vi capsular polysaccharide vaccine, oral live-attenuated Ty21a, and the heat-phenol-inactivated parenteral vaccine.)

MAJOR OUTCOMES CONSIDERED

Not stated

METHODOLOGY

METHODS USED TO COLLECT/SELECT EVIDENCE

Searches of Electronic Databases

DESCRIPTION OF METHODS USED TO COLLECT/SELECT THE EVIDENCE

Discussions of clinical features and recommendations are based on extensive Medline searches, and specific citations are given throughout the guideline document.

NUMBER OF SOURCE DOCUMENTS

Not stated

METHODS USED TO ASSESS THE QUALITY AND STRENGTH OF THE EVIDENCE

Weighting According to a Rating Scheme (Scheme Given)

RATING SCHEME FOR THE STRENGTH OF THE EVIDENCE

Grades reflecting the quality of evidence on which recommendations are based

I. Evidence from at least one properly randomized, controlled trial
II. Evidence from at least one well-designed clinical trial without randomization, from cohort or case-controlled analytic studies (preferably from more than one center), from multiple time-series studies, or from dramatic results of uncontrolled experiments
III. Evidence from opinions of respected authorities based on clinical experience, descriptive studies, or reports of expert committees

METHODS USED TO ANALYZE THE EVIDENCE

Systematic Review

DESCRIPTION OF THE METHODS USED TO ANALYZE THE EVIDENCE

Not stated

METHODS USED TO FORMULATE THE RECOMMENDATIONS

Not stated

RATING SCHEME FOR THE STRENGTH OF THE RECOMMENDATIONS

Strength of recommendation:

A. Good evidence to support a recommendation for use
B. Moderate evidence to support a recommendation for use
C. Poor evidence to support a recommendation
D. Moderate evidence to support a recommendation against use
E. Good evidence to support a recommendation against use

COST ANALYSIS

Cost-Effectiveness of Stool Culture

If one calculates from the yield and price of stool cultures a cost per positive result, as initially done by researchers in 1980, the cost can be US$952 to $1200. This impressive cost derives from (1) the relative insensitivity of the test for the most likely pathogens and (2) the poor selection of specimens being cultured for what can be sought. Although the costs associated with testing are an important consideration, the cost per positive stool culture is an incomplete and misleading measure of the value of diagnostic testing. Because diagnostic stool testing is a method of obtaining information for both individual patient care and public health purposes, better predictive factors for ordering tests should also be used.

METHOD OF GUIDELINE VALIDATION

Peer Review

DESCRIPTION OF METHOD OF GUIDELINE VALIDATION

Not stated

RECOMMENDATIONS

MAJOR RECOMMENDATIONS

Each recommendation includes a ranking for the strength and the quality of evidence supporting it, as well as performance indicators. Definitions of the levels of evidence (I-III) and grades of recommendation (A-E) are repeated at the end of the Major Recommendations field.

Clinical Recommendations

Initial Rehydration

The most common risks with diarrheal illnesses are dehydration and, in developing countries, malnutrition. Thus, the critical initial treatment must include rehydration, which can be accomplished with an oral glucose or starch-containing electrolyte solution in the vast majority of cases (A-I). Although many patients with mild diarrhea can prevent dehydration by ingesting extra fluids (such as clear juices and soups), more severe diarrhea, postural light-headedness, and reduced urination signify the need for more rehydration fluids. Oral rehydration solutions approaching the World Health Organization-recommended electrolyte concentrations (e.g., Ceralyte, Pedialyte, or generic solutions) can be purchased at local pharmacies or obtained from pediatricians. World Health Organization-recommended oral rehydration solutions can also be prepared by a pharmacy by mixing 3.5 g of NaCl, 2.5 g of $NaHCO_3$ (or 2.9 g of Na citrate), 1.5 g of KCl, and 20 g of glucose or glucose polymer (e.g., 40 g of sucrose or 4 tablespoons of sugar or 50–60 g of cooked cereal flour such as rice, maize, sorghum, millet, wheat, or potato) per liter (1.05 qt) of clean water. This makes a solution of approximately Na 90 mM, K 20 mM, Cl 80 mM, HCO_3 30 mM, and glucose 111 mM.

The evidence supporting this recommendation for all patients with dehydrating diarrhea is well documented. Because oral rehydration therapy has been shown to be widely applicable throughout the world, it was hailed in 1978 as "potentially the most important medical advance of this century." Administration of this solution is not only lifesaving in cases of severe diarrhea in settings where intravenous fluids are difficult to administer but is also less painful, safer, less costly, and superior to administration of intravenous fluids for persons who are able to take oral fluids. The patient´s thirst decreases as he or she is rehydrated, which helps protect against overhydration. Stool output can be further reduced with food-based oral rehydration therapy. Vitamin A and zinc repletion should be considered for patients with likely or documented deficiency. Promising new

approaches to oral rehydration and nutrition therapy, incorporating glutamine or its derivatives to further help mucosal-injury repair, are being developed.

Patient Evaluation

As recommended in widely used algorithms with detailed footnotes and in similar tables published elsewhere, obtaining a thorough history, including both clinical and epidemiological features, should be the first step in evaluating a patient who presents with any significant diarrheal illness (i.e., profuse, dehydrating, febrile, or bloody diarrhea, especially in infants and elderly or immunocompromised patients; see figure 1 in the guideline document) (A-II). Relevant clinical features include:

1. When and how the illness began (e.g., abrupt or gradual onset and duration of symptoms)
2. Stool characteristics (watery, bloody, mucous, purulent, greasy, etc.)
3. Frequency of bowel movements and relative quantity of stool produced
4. Presence of dysenteric symptoms (fever, tenesmus, blood and/or pus in the stool)
5. Symptoms of volume depletion (thirst, tachycardia, orthostasis, decreased urination, lethargy, decreased skin turgor)
6. Associated symptoms and their frequency and intensity (nausea, vomiting, abdominal pain, cramps, headache, myalgias, altered sensorium)

In addition, all patients should be asked about potential epidemiological risk factors for particular diarrheal diseases or for their spread. These include the following:

1. Travel to a developing area
2. Day-care center attendance or employment
3. Consumption of unsafe foods (e.g., raw meats, eggs, or shellfish; unpasteurized milk or juices) or swimming in or drinking untreated fresh surface water from, for example, a lake or stream
4. Visiting a farm or petting zoo or having contact with reptiles or with pets with diarrhea
5. Knowledge of other ill persons (such as in a dormitory or office or a social function)
6. Recent or regular medications (antibiotics, antacids, anti-motility agents)
7. Underlying medical conditions predisposing to infectious diarrhea (acquired immunodeficiency syndrome [AIDS], immunosuppressive medications, prior gastrectomy, extremes of age)
8. (where appropriate) receptive anal intercourse or oral-anal sexual contact
9. Occupation as a food-handler or caregiver

For persons with AIDS, a modified algorithm has been published with recommendations for initial diagnosis and therapy as well as more invasive evaluation. Diarrhea continues to be an important problem for patients with AIDS, even in the era of highly active antiretroviral therapy.

A directed physical examination may also give clues as to the appropriate evaluation and treatment of an acute diarrheal illness. It is particularly important to observe for abnormal vital signs (including fever, orthostatic pulse, and blood

pressure changes), other signs of volume depletion (dry mucous membranes, decreased skin turgor, absent jugular venous pulsations), abdominal tenderness, and altered sensorium.

The predominant clinical features associated with the most common infectious diarrheal illnesses are given in table 8 of the guideline document. With few exceptions, the predictive value of any of the features listed is relatively low for any particular enteric pathogen. However, some of the diseases that are diagnosed by stool culture (shigellosis, salmonellosis, and campylobacteriosis) share certain inflammatory features such as fever, abdominal pain, bloody stools, and the presence in stools of leukocytes, fecal lactoferrin, and/or occult blood (II).

Fecal Testing

Developing better algorithms combining clinical and epidemiological features is an area for future research. For example, any diarrheal illness lasting >1 day, especially if accompanied by fever, bloody stools, systemic illness, recent use of antibiotics, day-care center attendance, hospitalization, or dehydration (defined as dry mucous membranes, decreased urination, tachycardia, symptoms or signs of postural hypotension, or lethargy or obtundation), should prompt evaluation of a fecal specimen, as noted below and in figure 1 of the guideline document. Additional diagnostic evaluations, such as serum chemistry analysis, complete blood cell count, blood cultures, urinalysis, abdominal radiography, anoscopy, and flexible endoscopy may be considered for selected cases in which disease severity or clinical and epidemiological features suggest the need for such testing.

A selective approach to fecal studies is recommended (see figure 1 of the guideline document). The enteric illness is profiled to place it in $\geq$1 categories, and for each of these tests are suggested. The categories include community-acquired or traveler´s diarrhea, especially if accompanied by fever or blood in the stool; nosocomial diarrhea that occurs 3 days after the start of hospitalization; and persistent diarrhea (B-II).

Although the presence of fecal leukocytes or lactoferrin further suggests an inflammatory diarrhea illness, such as those listed in panels A and B of figure 1 in the guideline document, experts differ regarding the routine use of screens for inflammatory infection for the initial testing of patients with community or nosocomial diarrhea (see figure 1A and 1B in the guideline document). However, a positive screen for patients with unexplained persistent or recurrent diarrhea suggests that consideration should be given to a diagnosis of possible inflammatory bowel disease (i.e., ulcerative colitis or Crohn´s disease) and that a gastroenterologist should be consulted. Patients infected with Shiga toxin-producing Escherichia coli (STEC) often have bloody diarrhea and negative or low levels of lactoferrin, indicating the need for a specialized approach for such patients.

Hospitalized patients (except, as noted above, those patients admitted for a diarrheal illness whose initial workup was incomplete or those patients whose diarrhea is suspected to be nosocomial in origin), especially those with abdominal pain, should be tested for Clostridium difficile toxin. Any illness that persists for >7 days (especially in an immunocompromised patient) should prompt further

testing of fecal specimens, as indicated in panel C in figure 1 of the guideline document. In suspected outbreaks of gastroenteritis, special studies of stool specimens and Escherichia coli isolates may be needed. New methods that involve the use of enzyme immunoassay (EIA) and DNA probe nonculture techniques are rapidly being developed and hold great promise for improved sensitivity. Routine performance of cultures, the traditional "gold standard," will remain critical for antibiotic resistance testing and for serotype determination and subtyping in outbreaks. Rotavirus infection, a leading cause of diarrhea in young children (especially in winter months in temperate climates) can be diagnosed with commercial assays, and Norwalk-like virus infections can be diagnosed with research assays, but these tests are usually not necessary for managing an individual case.

Noninfectious or extraintestinal causes of diarrhea should be considered when the compendium of diagnostic evaluation has not identified a pathogen. These causes include irritable bowel syndrome, inflammatory bowel disease (if recurring or persistent, with fecal leukocytes or lactoferrin, and unexplained), ischemic bowel disease (if the patient is >50 years old or has peripheral vascular disease), laxative abuse, partial obstruction, rectosigmoid abscess, Whipple´s disease, pernicious anemia, diabetes, malabsorption, small-bowel diverticulosis, scleroderma, or celiac sprue.

Therapeutic Considerations

Because of increasing threats from antimicrobial-resistant infections, side effects of treatment with antimicrobial agents, suprainfections when normal flora are eradicated by antimicrobial agents, and the possibility of induction of disease-producing phage by antibiotics (such as Shiga-toxin phage induced by quinolone antibiotics), any consideration of antimicrobial therapy must be carefully weighed against unintended and potentially harmful consequences. New nonantimicrobial treatments to block secretory or inflammatory toxins or to enhance electrolyte absorption and intestinal repair are badly needed and are under study.

One situation in which empirical antibiotics are commonly recommended without obtaining a fecal specimen is in cases of traveler´s diarrhea, in which enterotoxigenic Escherichia coli or other bacterial pathogens are likely causes, and prompt treatment with fluoroquinolone or, in children, trimethoprim-sulfamethoxazole (TMP-SMZ) can reduce the duration of an illness from 3–5 days to <1–2 days (A-I). Some also consider empirical treatment of diarrhea that lasts longer than 10–14 days for suspected giardiasis, if other evaluations are negative and, especially, if the patient´s history of travel or water exposure is suggestive. Otherwise, for patients with febrile diarrheal illnesses, especially those believed to have moderate to severe invasive disease, empirical treatment should be considered (after a fecal specimen is obtained for the performance of the studies noted above). This empirical treatment can be with an agent such as a quinolone antibiotic or, for children, trimethoprim-sulfamethoxazole, which can reduce the duration and shedding of organisms in infections with susceptible Shigella species (A-I) and possibly in infections with susceptible Campylobacter species (B-II).

However, there is a worrisome worldwide increase in quinolone-resistant Campylobacter infections ($\underline{\leq}$10.2% in Minnesota), and such infections may possibly be worsened by quinolone eradication of competing normal flora.

Quinolone resistance that develops during treatment and is accompanied by symptomatic relapse has been described with regard to Campylobacter. Erythromycin may reduce the duration of illness and shedding of susceptible Campylobacter jejuni, particularly when given early in the illness. Salmonella infections may warrant quinolone or other antimicrobial therapy when systemic spread is considered a risk or suspected and for children <6 months of age; however, like other antibiotics, quinolones may prolong shedding of non-typhi species of Salmonella.

A particularly worrisome development is the appearance of multiple-drug resistance, including resistance to quinolones, in clinical Salmonella strains. Antibiotics should not be prescribed simply to reduce the likelihood of secondary transmission. Other interventions, such as hand-washing, can achieve the same ends without introducing the risk of selecting for resistance.

Suspected or documented Shiga toxin-producing Escherichia coli infections should not be treated with antimotility agents (E-II), and a decision to treat an illness that could be due to Shiga toxin-producing Escherichia coli O157 with an antimicrobial agent should be considered carefully, as it may worsen the risk of hemolytic uremic syndrome developing. Treatment of Shiga toxin-producing Escherichia coli O157 infections with antimicrobial agents has not been shown to ameliorate illness, and several retrospective studies have noted a higher rate of hemolytic uremic syndrome (HUS) in treated patients, which could be an effect of treatment or a reflection of more aggressive treatment of patients who are more ill. In vitro data indicate that certain antimicrobial agents can increase the production of Shiga toxin, and animal studies have demonstrated harmful effects of antibiotic treatment of Shiga toxin-producing Escherichia coli infections. In Japan, both nonrandomized studies of patients and in vitro studies suggest that fosfomycin, a non–beta-lactam cell wall–synthesis inhibitor (licensed only for urinary tract infections in the United States), may be safe and possibly improve the clinical course, but further study is needed (C-III).

Details of diagnosis and treatment of specific infections are summarized in table 9 of the guideline document. Because of changing patterns of antimicrobial resistance, recent local patterns are critical to making decisions about antimicrobial therapy.

An increasing amount of information suggests that Aeromonas is an enteric pathogen in the healthy host; it is usually associated with mild, though sometimes chronic and sometimes bloody, diarrhea. Trimethoprim-sulfamethoxazole is the agent of choice if antimicrobial therapy is deemed necessary. The data supporting the pathogenicity of Plesiomonas are somewhat weaker; laboratory evidence of its pathogenicity is quite thin. However, particularly in the setting of a diarrheal illness following travel or shellfish consumption, if other pathogens have not been isolated it could be considered in the differential diagnosis. Anecdotal reports suggest that trimethoprim-sulfamethoxazole might diminish the duration of symptoms.

Table 2 in the guideline document summarizes the major recommendations detailed in these guidelines. Initial rehydration, clinical and epidemiological evaluation, and selecting appropriate fecal studies and therapy are key to optimal diagnosis and management, and reporting suspected outbreaks and cases of

notifiable illnesses to local health authorities is vital in order to allow measures to be taken to investigate threats of enteric infection arising from our increasingly global and industrialized food supplies. Parenteral (Vi) or oral (Ty21a) typhoid vaccines are recommended for travelers to areas where typhoid is endemic who are at high risk for infection because they are not staying at the usual tourist hotels; new live and killed oral cholera vaccines are becoming available outside the United States.

Public Health Recommendations

Diagnostic Fecal Testing for Public Health Reasons

Diagnostic testing of stool specimens is indicated for certain groups of people who are not themselves patients. Food-handlers in food service establishments and health care workers involved in direct patient care should be tested for bacterial pathogens if they have diarrhea because of their potential to transmit infection to large numbers of persons. Similarly, diarrheal illness in a day-care attendee, day-care employee, or resident of an institutional facility (e.g., psychiatric hospital, prison, or nursing home) should be evaluated for bacterial or parasitic infection because gastrointestinal illnesses in these settings may indicate that a disease outbreak is occurring. Physicians who suspect a disease outbreak is occurring because they have observed an increased incidence of diarrheal disease among a particular group should request the types of diagnostic testing appropriate to the clinical illness in order to facilitate identification of the etiologic agent and to define the extent of the outbreak. The suspected outbreak should also be reported to public health authorities.

Disease Reporting

The reporting of specific infectious diseases to the appropriate public health authorities is the cornerstone of public-health surveillance, outbreak detection, and prevention and control efforts. Clinicians and clinical laboratories have a central role in this process. Although reporting requirements and procedures differ by jurisdictions, in most communities reporting begins when a notifiable infection is diagnosed and reported to the local or state health department. Requirements for the reporting of disease can be obtained from the state or local health department or at the Web site of the Council of State and Territorial Epidemiologists: www.cste.org.

If an outbreak is suspected, early reporting can lead to prompt investigations that may result in source detection and, ultimately, prevention of additional illnesses. Local health departments can counsel individual patients, conduct outbreak investigations, assist in contact notification, and provide follow-up for patients involved in disease outbreaks. Health departments can also provide information on disease prevention to the general public or persons at increased risk for diarrheal diseases, and they are usually best suited for handling inquiries from print and electronic media.

Isolate Subtyping

For several enteric bacterial organisms, public-health surveillance depends on subtyping the clinical isolates in the state public health laboratory to detect and

investigate outbreaks and to define the success of control measures. Salmonella isolates are routinely serotyped. Beginning in 1997, state public health laboratories also began performing standardized pulsed-field gel electrophoresis (PFGE) on isolates of Shiga toxin-producing Escherichia coli O157 and comparing the patterns they identified with a national database maintained at the Centers for Disease Control and Prevention (CDC). PulseNet, as this national network for molecular subtyping is called, has since been expanded to include serotyping of isolates of Salmonella, Shigella, and Listeria, and it has been critical to the detection, early termination, and even prevention of outbreaks of food-borne illness. Molecular subtyping strategies are being developed for viral pathogens, such as hepatitis A and caliciviruses, and may be available for routine public health practice in the future.

Follow-up Testing

In certain situations, assurance should be obtained that a patient with a laboratory-confirmed bacterial or parasitic diarrheal disease has been cured or is no longer a fecal carrier. Because food-handlers and health care workers can transmit bacterial and parasitic diseases even if they are asymptomatic, it is recommended that before returning to their jobs these persons have 2 consecutive negative stool samples taken 24 hours apart and at least 48 hours after resolution of symptoms. If the patient has received antimicrobial therapy, the first stool specimen should be obtained at least 48 hours after the last dose. Furthermore, if food-handlers or health care workers are symptomatic, they should be excluded from directly handling food and from caring for high-risk patients.

Regulations vary by jurisdiction and by pathogen, so providers should contact their local public health office before advising persons in these job categories. Public health officials may be able to assist by obtaining follow-up samples and providing patient education. Diarrheal illnesses in day-care attendees and employees should be managed carefully because of the high likelihood of person-to-person spread of common pathogens, such as Escherichia coli O157:H7 and Shigella sonnei. Approaches to prevention and control of diarrheal disease in day-care settings have included requiring that ill children stay home, cohorting of convalescent children within the center, and education of the community. Cooperation between the physicians who detect diarrheal illnesses among day-care contacts and the local public health personnel is critically important for identifying potential outbreaks and implementing effective control methods.

Preventing Illnesses Through Patient Education

Many diarrheal diseases can be prevented by following simple rules of personal hygiene and safe food preparation. Hand-washing with soap is an effective step in preventing spread of illness and should be emphasized for caregivers of persons with diarrheal illnesses. As noted above, human feces must always be considered potentially hazardous, whether or not diarrhea or potential pathogens have been identified. Consequently, microbial studies should not be needed to justify careful attention to hygiene.

Select populations may require additional education about food safety, and health care providers can play an important role in providing this information.

Immunocompromised persons (e.g., human immunodeficiency virus [HIV]-infected patients, cancer chemotherapy recipients, and persons receiving long-term oral steroids or immunosuppressive agents) are more susceptible to infection with a variety of enteric pathogens and often are more likely to develop illness of greater severity and more frequently accompanied by complications. Such persons can reduce their risk by learning and following safe food-handling and preparation practices.

Alcoholics and persons with chronic liver disease (hemachromatosis or cirrhosis) are at increased risk for infections due to Vibrio vulnificus from raw shellfish and should avoid them. Persons with impaired immune defenses are at increased risk for infection with Listeria monocytogenes from soft cheeses, unheated deli meats, and raw dairy products, and therefore they should avoid these foods. Pregnant women should avoid undercooked meats because of the risk of infection with Toxoplasma gondii and (like all persons) should avoid raw dairy products (e.g., unpasteurized milk or cheeses), soft French-style cheeses, and unheated deli meats, which carry an increased risk of Listeria monocytogenes infection; both organisms are associated with miscarriage.

Among young children and the elderly, illness caused by infection with Salmonella or Escherichia coli can be particularly devastating but is potentially preventable by following safe food practices.

General educational information on food safety is available from a number of sources, including many Web sites, such as:

- www.cdc.gov/ncidod/dbmd/diseaseinfo/foodborneinfections_g.htm
- www.fightbac.org
- www.foodsafety.gov
- www.healthfinder.gov
- www.nal.usda.gov/fnic/foodborne/foodborn.htm.

Although vaccines are not the focus of these management guidelines, currently available vaccines for typhoid fever in the United States are the parenteral Vi capsular polysaccharide vaccine, oral live-attenuated Ty21a vaccine (intermittently available), and the old (often toxic) heat-phenol-inactivated parenteral vaccine. Since typhoid fever in the United States in recent years has often been imported (i.e., usually acquired during international travel) and is potentially severe and largely preventable, it is recommend that the Vi or Ty21a (or, only for children <2 years old, the heat-phenol-inactivated) vaccine for those with significant likely exposure (B-II).

With regard to cholera vaccines, only the old parenteral vaccine is licensed for use in the United States at the time of this writing, and it is not recommended because of the extremely low risk of cholera to the traveler and the limited efficacy of the vaccine. New oral live (CVD 103HgR) and killed (whole-cell B-subunit) vaccines are licensed outside the United States and are used by some travelers. The rotavirus vaccine, although effective, has presented complications in the form of rare cases of intussusception; it is no longer marketed and thus is not recommended.

Definitions of Strength of Recommendation and Quality of Evidence Ratings

Quality of evidence

I. Evidence from at least one properly randomized, controlled trial
II. Evidence from at least one well-designed clinical trial without randomization, from cohort or case-control analytic studies (preferably from more than one center), from multiple time-series studies, or from dramatic results of uncontrolled experiments
III. Evidence from opinions of respected authorities based on clinical experience, descriptive studies, or reports of expert committees

Strength of recommendation

A. Good evidence to support a recommendation for use
B. Moderate evidence to support a recommendation for use
C. Poor evidence to support a recommendation
D. Moderate evidence to support a recommendation against use
E. Good evidence to support a recommendation against use

CLINICAL ALGORITHM(S)

The original guideline contains a clinical algorithm for recommendations for the diagnosis and management of diarrheal illness.

EVIDENCE SUPPORTING THE RECOMMENDATIONS

TYPE OF EVIDENCE SUPPORTING THE RECOMMENDATIONS

The type of supporting evidence is identified and graded for each recommendation (see "Major Recommendations").

BENEFITS/HARMS OF IMPLEMENTING THE GUIDELINE RECOMMENDATIONS

POTENTIAL BENEFITS

For clinicians, early diagnosis of an acute episode of diarrhea can lead to interventions that alleviate symptoms and prevent secondary transmission. For public health practitioners, prompt notification of pathogen-specific diagnoses and subtyping of bacterial isolates through public health surveillance can lower rates of transmission and lead to timely detection and control of outbreaks.

Subgroups Most Likely to Benefit:

The following patients groups are at high risk for diarrheal disease and its spread:

- Individuals who travel to a developing area
- Children who attend day-care center and employees of those centers

- Individuals who consume unsafe foods (e.g., raw meats, eggs, or shellfish; unpasteurized milk or juices) or who swim in or drink untreated fresh surface water
- Individuals who visit a farm or petting zoo or have contact with reptiles or with pets with diarrhea
- Individuals in contact with other ill persons (such as in a dormitory or office or a social function)
- Individuals who have recently been on a course of antibiotics
- Individuals with underlying medical conditions predisposing to infectious diarrhea (acquired immunodeficiency syndrome [AIDS], immunosuppressive medications, prior gastrectomy)
- Very young children and the elderly
- Individual who practice anal intercourse or have oral-anal sexual contact
- Those whose occupation is as a food-handler or caregiver

POTENTIAL HARMS

Because of increasing threats from antimicrobial-resistant infections, side effects of treatment with antimicrobial agents, suprainfections when normal flora are eradicated by antimicrobial agents, and the possibility of induction of disease-producing phage by antibiotics (such as Shiga-toxin phage induced by quinolone antibiotics), any consideration of antimicrobial therapy must be carefully weighed against unintended and potentially harmful consequences.

Subgroups Most Likely to Be Harmed:

Patients with suspected or documented Shiga toxin-producing Escherichia coli infections should not be treated with antimotility agents and a decision to treat an illness that could be due to Shiga toxin-producing Escherichia coli O157 with an antimicrobial agent should be considered carefully, as it may worsen the risk of hemolytic uremic syndrome developing. Treatment of Shiga toxin-producing Escherichia coli O157 infections with antimicrobial agents has not been shown to ameliorate illness, and several retrospective studies have noted a higher rate of hemolytic uremic syndrome in treated patients, which could be an effect of treatment or a reflection of more aggressive treatment of patients who are more ill.

QUALIFYING STATEMENTS

QUALIFYING STATEMENTS

The information in the guideline is intended to provide a working framework for clinicians and public health providers and should not override or be construed as a substitute for sound clinical decision-making.

IMPLEMENTATION OF THE GUIDELINE

DESCRIPTION OF IMPLEMENTATION STRATEGY

An implementation strategy was not provided.

IMPLEMENTATION TOOLS

Clinical Algorithm

For information about availability, see the "Availability of Companion Documents" and "Patient Resources" fields below.

INSTITUTE OF MEDICINE (IOM) NATIONAL HEALTHCARE QUALITY REPORT CATEGORIES

IOM CARE NEED

Getting Better
Staying Healthy

IOM DOMAIN

Effectiveness

IDENTIFYING INFORMATION AND AVAILABILITY

BIBLIOGRAPHIC SOURCE(S)

Guerrant RL, Van Gilder T, Steiner TS, Thielman NM, Slutsker L, Tauxe RV, Hennessy T, Griffin PM, DuPont H, Sack RB, Tarr P, Neill M, Nachamkin I, Reller LB, Osterholm MT, Bennish ML, Pickering LK. Practice guidelines for the management of infectious diarrhea. Clin Infect Dis 2001 Feb 1;32(3):331-51. [222 references]

ADAPTATION

Not applicable: The guideline was not adapted from another source.

DATE RELEASED

2001 Feb

GUIDELINE DEVELOPER(S)

Infectious Diseases Society of America - Medical Specialty Society

SOURCE(S) OF FUNDING

Infectious Diseases Society of America (IDSA)

GUIDELINE COMMITTEE

Not stated

COMPOSITION OF GROUP THAT AUTHORED THE GUIDELINE

Authors: Richard L. Guerrant; Thomas Van Gilder; Ted S. Steiner; Nathan M. Thielman; Laurence Slutsker; Robert V. Tauxe; Thomas Hennessy; Patricia M. Griffin; Herbert DuPont; R. Bradley Sack; Phillip Tarr; Marguerite Neill; Irving Nachamkin; L. Barth Reller; Michael T. Osterholm; Michael L. Bennish; Larry K. Pickering.

FINANCIAL DISCLOSURES/CONFLICTS OF INTEREST

Not stated

GUIDELINE STATUS

This is the current release of the guideline.

GUIDELINE AVAILABILITY

Electronic copies: Available (in HTML and PDF format) from the Infectious Diseases Society of America (IDSA) Web site.

Print copies: Available from Infectious Diseases Society of America, 66 Canal Center Plaza, Suite 600, Alexandria, VA 22314.

AVAILABILITY OF COMPANION DOCUMENTS

None available

PATIENT RESOURCES

None available

NGC STATUS

This summary was completed by ECRI on September 17, 2001. The information was verified by the guideline developer as of November 21, 2001.

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